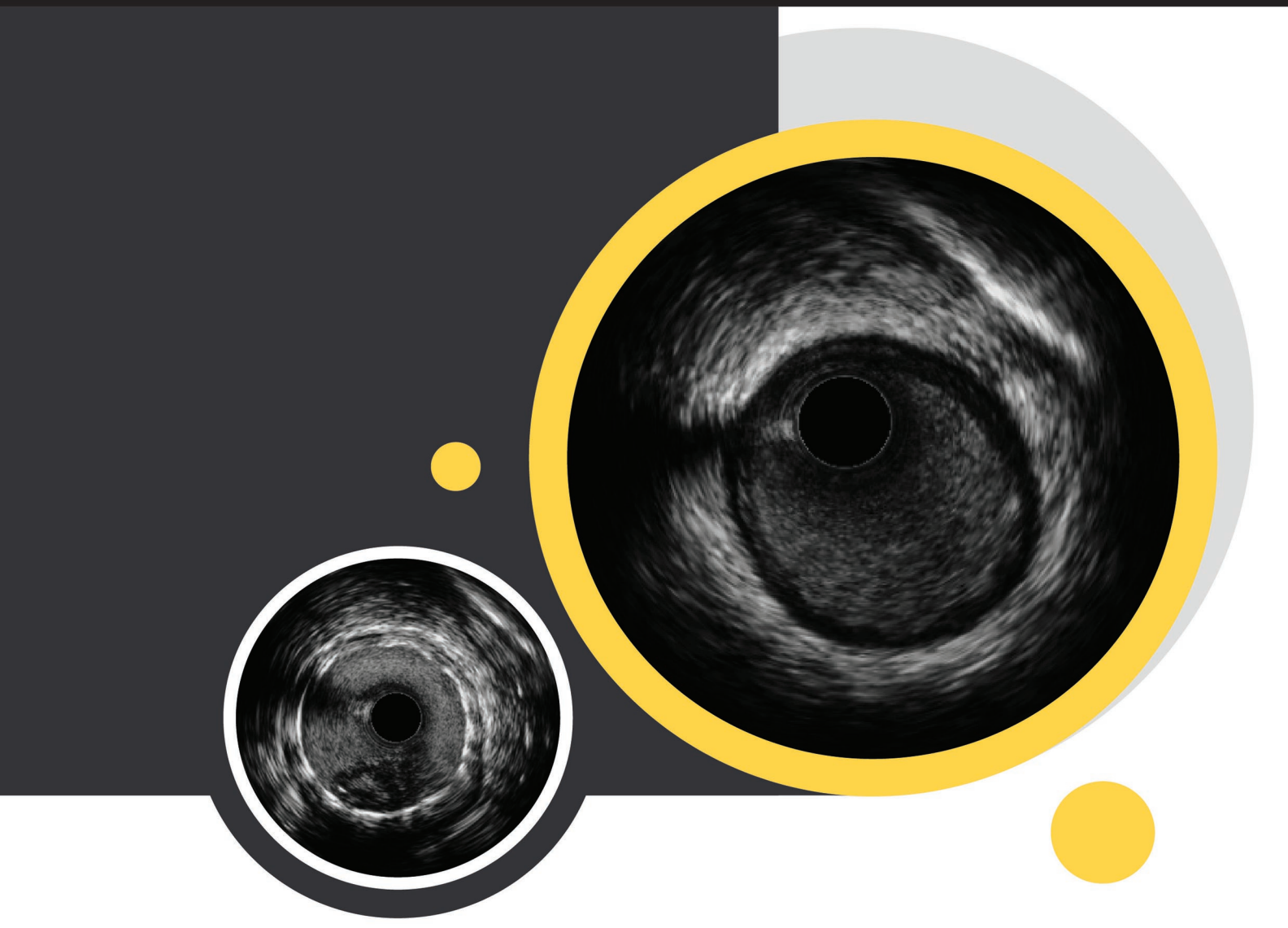
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IVUS A to Z

A Comprehensive Atlas of Intravascular Ultrasound

Pankaj Manoria
Prasant Kumar Sahoo

Forewords
Ashok Seth
AB Mehta

JAYPEE

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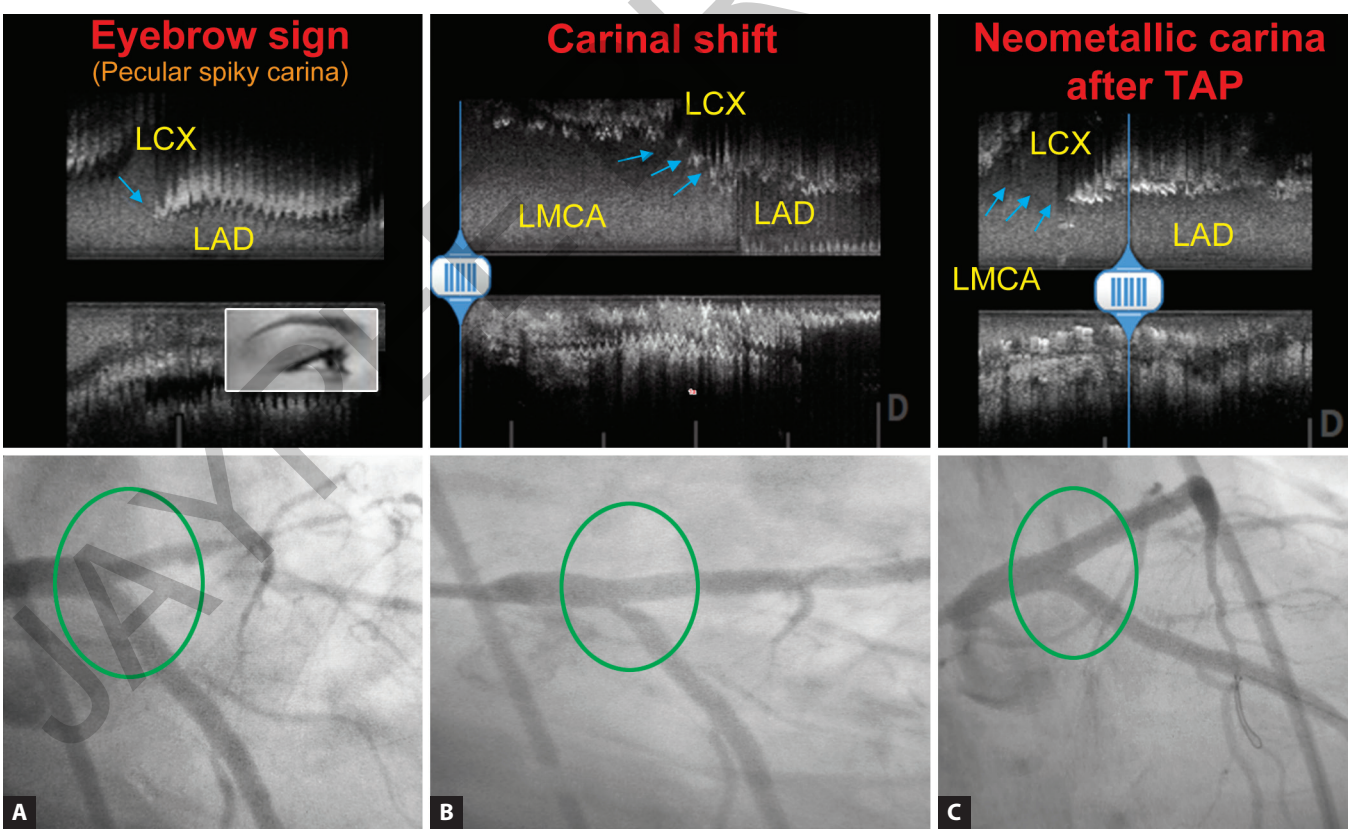
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CHAPTER 28

Intravascular Ultrasound Predictors of Side Branch Pinching

Following are the intravascular ultrasound (IVUS) predictors of side branch (SB) pinching:

- **Hairy spiky carina (eyebrow sign)** ***(Figs. 1A to C)****:* If the reconstructed carina, as seen on L view, appears pointed/elongated, then any crossover stenting can push the carina toward SB and can lead to occlusion of SB.
- **Branching point-carinal tip** *(BP-CT length <1.7 mm)* ***(Fig. 2)****:* The shorter the BP-CT length, the more chances of carinal shift.
- **Calcium in the main branch (MB), opposite SB** ***(Figs. 3 and 4)*****:** Any calcium on the MB opposite the carina will resist expansion of the stent on the calcium side and will, in turn, push the carina toward the SB (noncalcium side), leading to carinal shift.
- **Lipid-rich plaque at the ostia of SB** ***(Fig. 5)****:* The lipid-rich plaque during crossover stenting can embolize distally, leading to SB compromise.
- **SB diameter ratio >1.5** ***(Fig. 6)****:* It is the ratio of SB total diameter (EL-EL)/SB luminal diameter



Figs. 1A to C: (A) Hairy spiky carina (eyebrow sign); (B) Carinal shift with pinching of left circumflex (LCX) after crossover stenting left main coronary artery (LMCA) to left anterior descending (LAD); (C) Carinal geometry restored after putting another stent by T and small protrusion (TAP) technique.

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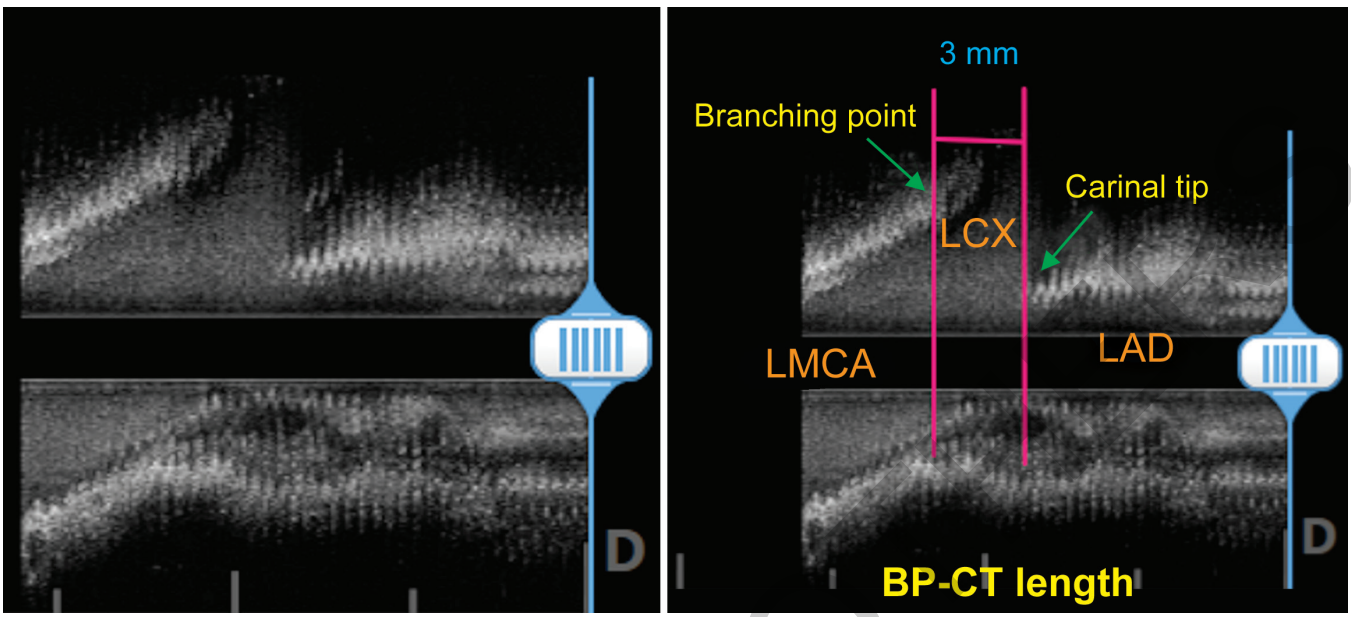


Fig. 2: BP-CT length on IVUS. (BP-CT: branching point-carinal tip; IVUS: intravascular ultrasound; LAD: left anterior descending; LCX: left circumflex; LMCA: left main coronary artery)

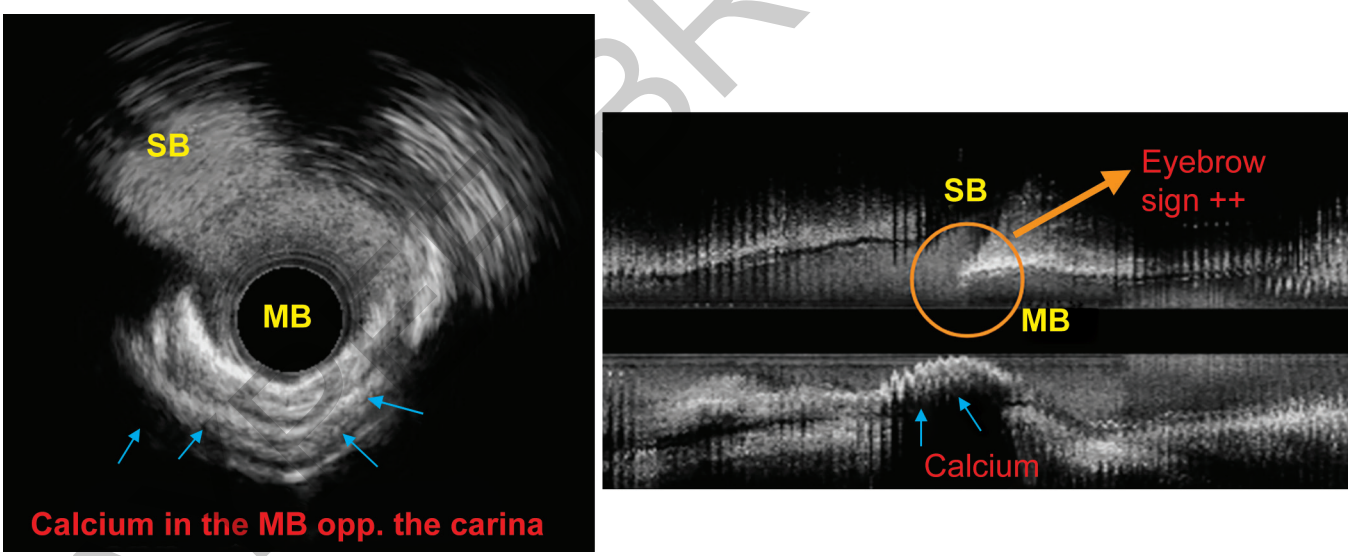


Fig. 3: Calcium in the main branch (MB), opposite side branch (SB).

(intima-intima). If the ratio is >1.5, it indicates significant plaque at the SB ostia and is a precursor of SB pinching.

- **Distal or circumfential plaque distribution of SB:** The side branch at the time of IVUS pullback from the main branch can predict side branch occlusion. There are 3 types of plaque distribution in the SB as assessed from the MB IVUS pullback **(Figs. 7A to C)**. The first type is the No SB lesion group, where there may be visible stenosis in the ostia of SB on angio but no lesion found on IVUS (this has the least chance of SB occlusion). The second type is the SB lesion proximal type with the lesion only in the proximal part of SB. The third type is the SB lesion Distal or circumferential type with plaque in the distal part or entire circumferential of SB, having the maximum chance of SB occlusion.

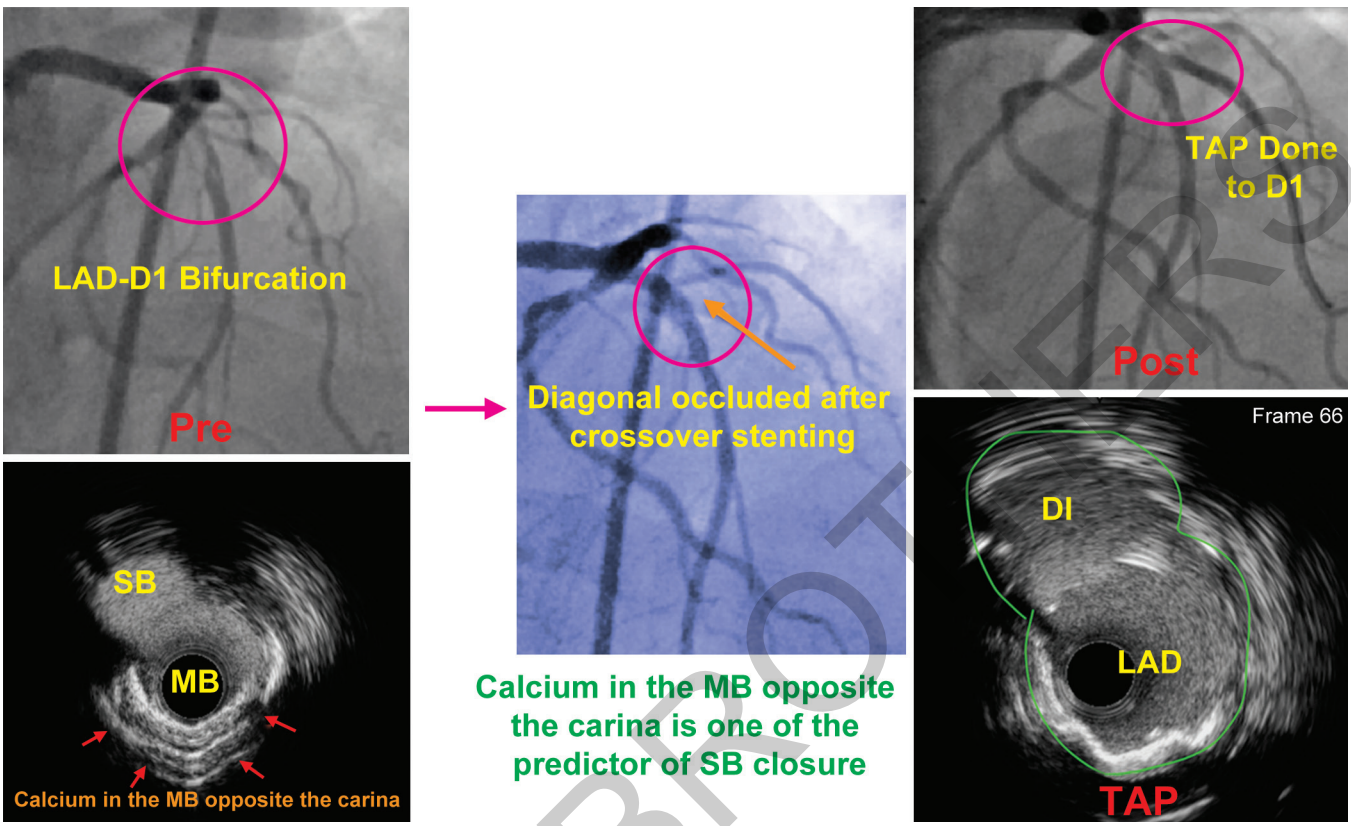


Fig. 4: There was a calcification in the MB (LAD) opposite the carina. During crossover stenting, the carina got shifted and led to occlusion of the SB (D1), which was, however, bailed out by doing a TAP stenting.

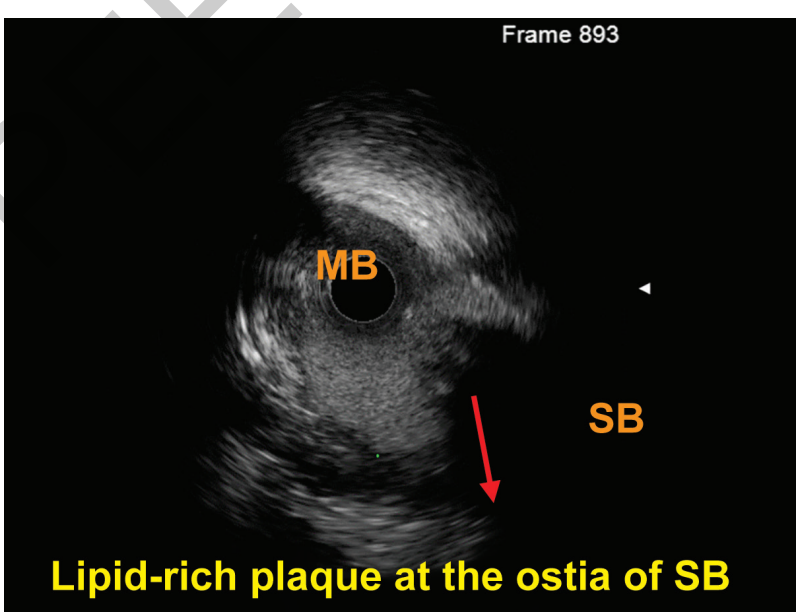


Fig. 5: Lipid-rich plaque at the ostia of SB is one of the predictor of SB occlusion.

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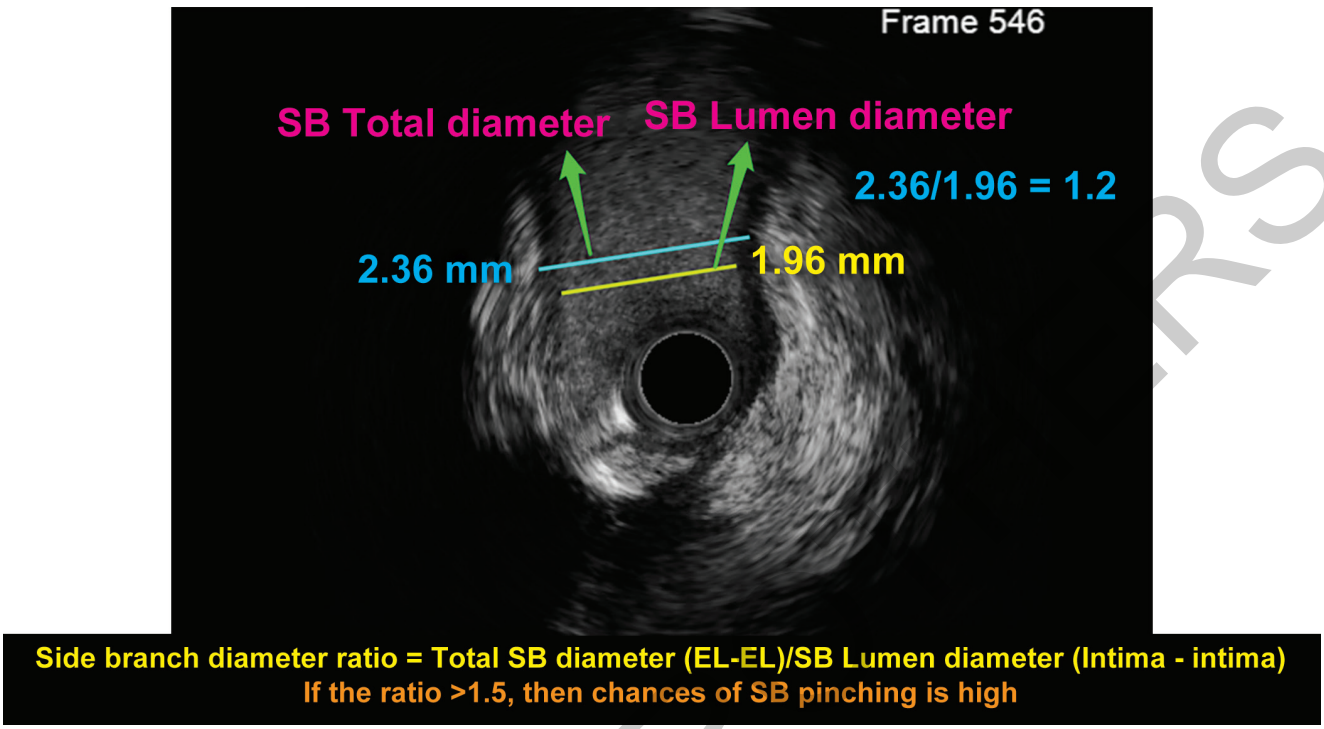
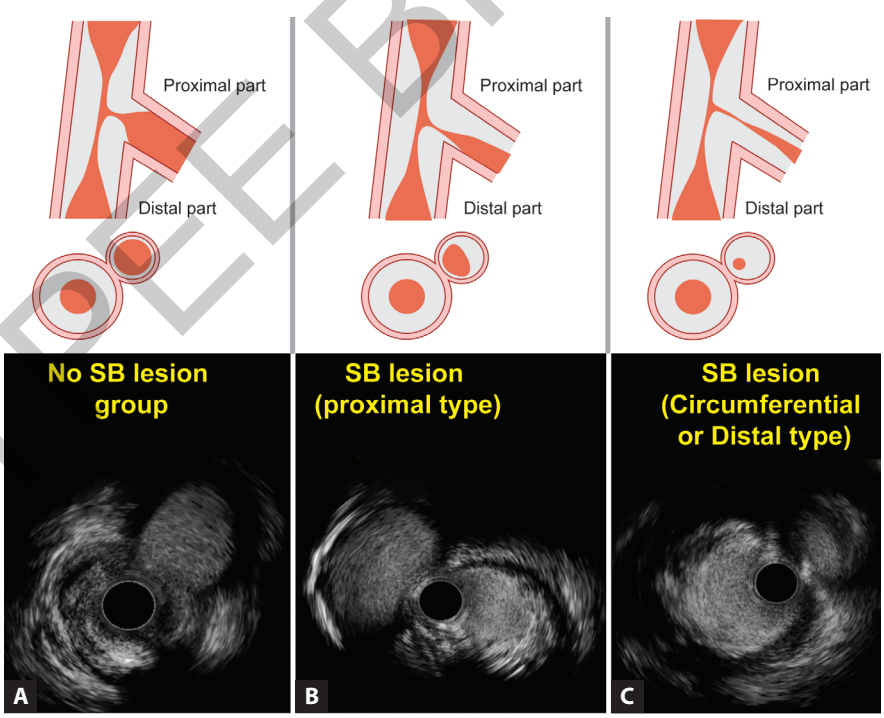


Fig. 6: SB diameter ratio estimation on IVUS. (IVUS: intravascular ultrasound; SB: side branch).



Figs. 7A to C: Classification according to the plaque distribution in the side branches assessed during IVUS pullback from the main branch.

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IVUS A to Z

A Comprehensive Atlas of Intravascular Ultrasound

Salient Features

- Simple and easy to read
- High-quality images from high-definition intravascular ultrasound (HD-IVUS) 60 MHz from Boston
- Very useful for understanding the practical application of IVUS
- Self-explanatory illustrations
- Step-by-step approach to understanding IVUS
- Valuable reference for interventionalists, trainees, and catheterization laboratory staff
- Covers all the aspects, right from basics to live IVUS.



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